

CLAIMS

We claim:

1. A surface-coated Al/Zn steel sheet comprising a surface coating having as its principal constituent a urethane resin comprising acid amide groups, said resin having a ratio of urethane bonds to acid amide bonds in the range from 9:1 to 1:9.
2. The surface-coated Al/Zn steel sheet of claim 1, wherein the coating further comprises a chromium compound.
3. The surface-coated Al/Zn steel sheet of claim 2, wherein the resin/Cr weight ratio, of dry weight of the resin comprising acid amide bonds to weight of the chromium compound, calculated as metallic chromium, is in a range from 1 to 200.
4. The surface-coated Al/Zn steel sheet of claim 2, wherein the chromium compound is present in the coating in a range from 1 to 100 mg/m<sup>2</sup>, calculated as metallic chromium.
5. The surface-coated Al/Zn steel sheet of claim 1 with outstanding alkali resistance, cold-rollability, and corrosion resistance, comprising:
  - a chromium-free surface coating and having on at least one surface a coating which comprises:
    - A) a urethane resin with acid amide groups, with a ratio of urethane bonds to acid amide bonds in the range from 9:1 to 1:9.

B) one or more metal compounds selected from the group consisting of Al, Mg, Ca, Zn, Ni, Co, Fe, Zr, Ti, V, W, Mn, and Ce compounds, and

C) a silicon compound;

wherein said coating-weight is from 0.2 to 5.0 g/m<sup>2</sup>.

6. The surface-coated Al/Zn steel sheet of claim 5, wherein component B comprises a Zr compound, and component C comprises one or more silicon compounds selected from the group consisting of silica, silicic salts, colloidal silicon dioxide, and silane coupling reagents.
7. The surface-coated Al/Zn steel sheet of claim 6, wherein component C comprises one or more silane coupling reagents.
8. The surface-coated Al/Zn steel sheet of claim 7, wherein component B comprises one or more Zr compounds and the mass ratio of component A solids to Zr in the Zr compounds of component B is in a range from 1 to 300.
9. The surface-coated Al/Zn steel sheet of claim 8, wherein the weight ratio of component A solids to Si in the silane coupling reagent is in a range from 10 to 800.
10. A chromium-free surface-treatment composition for metal sheets, which comprises:
  - A) a urethane resin with introduced acid amide groups, with a ratio of urethane bonds to acid amide bonds in the range from 9:1 to 1:9,
  - B) one or more metal compounds selected from the group

consisting of Al, Mg, Ca, Zn, Ni, Co, Fe, Zr, Ti, V, W, Mn, and Ce compounds, and

C) a silicon compound;

said surface-treatment composition being chromium-free.

11. The chromium-free surface-treatment composition for metal sheets of claim 10, wherein component B comprises a Zr compound, and component C comprises one or more silicon compounds selected from the group consisting of silica, silicic salts, colloidal silicon dioxide, and silane coupling reagents.
12. The chromium-free surface-treatment composition for metal sheets of claim 11, wherein component C comprises one or more silane coupling reagents.
13. The chromium-free surface-treatment composition for metal sheets of claim 12, wherein component B comprises one or more Zr compounds and the mass ratio of component A solids to Zr in the Zr compounds of component B is in a range from 1 to 300.
14. The chromium-free surface-treatment composition for metal sheets of claim 13, wherein the weight ratio of component A solids to Si in the silane coupling reagent is in a range from 10 to 800.
15. The surface-coated Al/Zn steel sheet of claim 5, wherein component B comprises one or more Zr compounds and the mass ratio of component A solids to Zr in the Zr compounds of

component B is in a range from 1 to 300.

16. The chromium-free surface-treatment composition for metal sheets of claim 10, wherein component B comprises one or more Zr compounds and the mass ratio of component A solids to Zr in the Zr compounds of component B is in a range from 1 to 300.
17. A chromium-free surface-treatment composition for metal sheets, which comprises:
  - A) an acrylic resin with introduced acid amide groups,
  - B) a Zr compound, and
  - C) one or more silicon compounds selected from the group consisting of silica, silicic salts, colloidal silicon dioxide, and silane coupling reagentssaid surface-treatment composition being chromium-free.
18. The chromium-free surface-treatment composition for metal sheets of claim 17, wherein component C comprises one or more silane coupling reagents.
19. The chromium-free surface-treatment composition for metal sheets of claim 18, wherein the mass ratio of component A solids to Zr in the Zr compounds of component B is in a range from 1 to 300 and the weight ratio of component A solids to Si in the silane coupling reagent is in a range from 10 to 800.